

**In the Claims:**

Please amend the claims as follows:

1. A stabilised gain semiconductor optical amplifier including an active waveguide  $[(1)]$  comprising: an amplification medium  $[(2)]$ , extending in longitudinal  $[(Z)]$ , lateral  $[(X)]$  and vertical  $[(Y)]$  directions, and coupled to a laser oscillation structure, ~~characterized in that~~ wherein said laser oscillation structure comprises at least two resonant cavities ~~(13, 14, 18, 19)~~ extending in first  $[(D1)]$  and second  $[(D2)]$  directions which are different from the longitudinal direction  $[(Z)]$  of the active waveguide  $[(1)]$  and arranged in such a way as to permit the establishment of laser oscillations having at least two different relaxation oscillation frequencies.
2. The  $[[An]]$  optical amplifier according to claim 1, ~~characterized in that~~ wherein said resonant cavities  $[(13, 14)]$  have different optical path lengths.
3. The  $[[An]]$  optical amplifier according to ~~one of claims~~ claim 1, ~~and 2 characterised in that~~ wherein said resonant cavities  $[(13, 14)]$  are associated with different wavelengths.
4. The  $[[An]]$  optical amplifier according to ~~one of claims~~ claim 1, ~~to 3 characterised in that~~ wherein said resonant cavities  $[(13, 14)]$  and said active waveguide  $[(1)]$  share at least in part said amplification medium  $[(2)]$ .
5. The  $[[An]]$  optical amplifier according to ~~one of claims~~ claim 1, ~~to 3 characterised in that~~ wherein said resonant cavities  $[(13, 14)]$  have first  $[(D1)]$  and second  $[(D2)]$  directions which are substantially parallel to each other and substantially perpendicular to said longitudinal direction  $[(Z)]$  and each share different portions of said amplification medium  $[(2)]$  of the active waveguide  $[(1)]$ .
6. The  $[[An]]$  optical amplifier according to ~~one of claims~~ claim 1, ~~to 5 characterised in that~~ ~~one~~ wherein at least one of said resonant cavities  $[(13, 14)]$  comprises a multi-mode interference amplification structure.

7. The [[An]] optical amplifier according to ~~one of claims~~ claim 1, ~~to 6 characterised in that~~ wherein said resonant cavities [(13, 14)] are defined by distributed Bragg reflectors.

8. The [[An]] optical amplifier according to ~~one of claims~~ claim 1, ~~to 7 characterised in that~~ wherein said resonant cavities [(13, 14)] are formed at least in a passive waveguide [(4)] which is placed below said active waveguide [(1)] on respective sides of the longitudinal sides of said active waveguide [(1)].

9. The [[An]] optical amplifier according to claim 1, ~~characterized in that~~ wherein said resonant cavities [(18, 19)] are defined by a structuring formed along the longitudinal sides of the active waveguide [(1)], which are parallel to said longitudinal direction [(Z)], and having at least one forbidden photonic band comprising at least two different reflection directions [(D1, D2)] for a photon wavelength included in the amplification band of said active waveguide [(1)].

10. The [[An]] optical amplifier according to claim 9, ~~characterized in that~~ wherein said structuring [(18, 19)] is produced at least in part in an upper layer [(3)] in which said active waveguide [(1)] is buried and in a passive waveguide [(4)], along the longitudinal edges of said active waveguide [(1)].

11. The [[An]] optical amplifier according to claim 9, ~~characterized in that~~ wherein said structuring [(18, 19)] is produced in said active waveguide [(1)] on respective sides of its longitudinal axis and in a part at least of an upper layer [(3)] which is placed above said active waveguide [(1)] and in a passive waveguide [(4)], placed below said active waveguide [(1)].

12. The [[An]] optical amplifier according to ~~one of claims~~ claim 9, ~~to 11 characterised in that~~ wherein said structuring [(18, 19)] defines substantially a photonic crystal of holes [(20)] or columns constituting diffracting elements and defining a mesh of the order of the wavelength of the photons in the guided mode flowing in said active waveguide.

13. The [[An]] optical amplifier according to ~~claim 12 in combination with one of claims claim 10, and 11 characterised in that~~ wherein said structure defines substantially a photonic crystal of holes or columns constituting diffracting elements and defining a mesh of the order of the wavelength of the photons in the guided mode flowing in said active waveguide whereby said holes [[(20)]] or columns extend substantially parallel to said vertical direction [[(Y)]] of the active waveguide [[(1)]].

14. The [[An]] optical amplifier according to ~~one of claims claim 12, and 13 characterised in that~~ wherein said photonic crystal is a paving arrangement of substantially contiguous convex polygons and share each of their edges with a single adjacent one.